PACIFICORP
A MIDAMERICAN ENERGY HOLDINGS COMPANY

METALCLAD SWITCHGEAR CIRCUIT BREAKER INSTALLATION

Version 3

PacifiCorp Substation Technical Services Form SF-CKB-SWG-INST

Refer to PacifiCorp procedure SP-CKB-SWG-INST, Version 3

The person(s) responsible for the job shall print their name(s) below as verification that the work has been performed correctly and the form filled out accurately. Each responsible person shall list their identifying number (1, 2, 3, 4, or 5) in the "Signed by" column next to the results of the tasks they perform.

Responsible person 1: Stephen Emero (PGE) **Phone number:** (801) 755-6094 **Date:** Aug 2, 202

Responsible person 2: Adam Hathaway (CVE) **Phone number:** (435) 580-9551 **Date:** Jul 18, 202

Responsible person 3: _____ **Phone number:** _____ **Date:** _____

Responsible person 4: _____ **Phone number:** _____ **Date:** _____

Responsible person 5: _____ **Phone number:** _____ **Date:** _____

Crew: Power Grid Engineering / Cache Valley Electric

Substation: Lassen Substation Work order: 10049825

Equipment Identification

PacifiCorp equipment / SAP number: 412736/27935	Position number in substation (bay): CB5G79
Manufacturer: Powell	Initial unit/cell number: Unit 4
Serial number: 025-PR-0817-0105	Model / type: VB15.0-20-4
Mechanism manufacturer: Powell	Manufacture date: 08-2017
Mechanism model: ML-17	Nameplate voltage (kV): 15kV
Mechanism type: ☒ Spring ☐ Solenoid	Operating voltage (kV): 12.47kV
Interrupting type: **Vacuum**	Continuous current rating (amps): 1,200 Amps
Interrupter rating (amps): 20,000 Amps	Control voltage - motor: 241.3 ☒AC ☐DC
BIL rating: 95kV	Control voltage - trip: 133.1 ☐AC ☒DC
Bushing catalog number: NA	Control voltage - close: 133.1 ☐AC ☒DC
Instruction book number - breaker: 01.4IB.66000B	Operations counter - AS FOUND: 00039
	AS LEFT: 00041

For results use A = acceptable, C = corrected, U = unacceptable, NA = not applicable to this equipment

For items marked 'C' or 'U' provide a detailed explanation in the comments section

General Inspection

	Signed by	Results
Inspect the breaker, bushings, insulators, bottles etc. for signs of damage	1	A
Ensure mechanism is lubricated as per manufacturer's specifications	1	A
Inspect all auxiliary contacts and associated linkages for proper operation and clean as necessary	1	A
Visually check the high-voltage vacuum/SF6 bottle compartment	1	A
Inspect circuit breakers finger cluster for proper operation	1	A

Inspect Operating Mechanism

	Signed by	Results
Measure and record the trip / close coil resistance below: Close coil: 20.5 ohms Trip coil 1: 12.1 ohms Trip coil 2: NA ohms	1	A
Inspect the mechanism for loose or missing components and correct alignment	1	A

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Inspect Operating Mechanism, *continued*

Perform all equipment manufacturer's operating mechanism measurements. List checks and adjustments (such as trip latch clearance, latch check switch, trip coil plunger)

	Mfr. specs	As found	As left	Signed by	Results
				1	NA
				1	NA
				1	NA
				1	NA
				1	NA
				1	NA
				1	NA
				1	NA
				1	NA
				1	NA

Vacuum Bottle Integrity Tests

Perform vacuum contact wipe measurements and list results below

		Measurements taken				
	Mfr specs	Pole 1	Pole 2	Pole 3	Signed by	Results
Contact wipe	>0.156"	0.275"	0.280"	0.295"	1	A

Perform vacuum contact erosion measurements and list results below

		Measurements taken				
	Mfr specs	Pole 1	Pole 2	Pole 3	Signed by	Results
Contact erosion	.375"-.425"	0.39"	0.385"	0.385"	1	A

Before performing a vacuum integrity test, verify voltage requirements from manufacturer requirements

			Pass/Fail				
	Test voltage	Hipot voltage mfr specs	Pole 1	Pole 2	Pole 3	Signed by	Results
☒ AC ☐ DC	25kV	25kV	Pass	Pass	Pass	1	A

Contact Resistance Tests (from bushing to bushing)

If readings are high, isolate where the problem is (connections, bushings, contacts)

		Measurements taken				
	Mfr specs	Pole 1	Pole 2	Pole 3	Signed by	Results
Micro ohm reading	<100μΩ	32.58μΩ	31.82μΩ	30.86μΩ	1	A

Insulation Resistance Tests

Perform insulation resistance tests phase to phase and phase to ground using a 5kV insulation resistance test set. All readings should equal or exceed 1,000 megohms. Test breaker open across open contacts of each phase

	Measurement taken			Signed by	Results
Breaker closed	Ø1 - Gnd	Ø2 - Gnd	Ø3 - Gnd	1	A
	396GΩ	260GΩ	658GΩ		
	Ø1 - Ø2	Ø2 - Ø3	Ø3 - Ø1	1	A
	773GΩ	623GΩ	736GΩ		
Breaker open	Ø1 - Ø1	Ø2 - Ø2	Ø3 - Ø3	1	A
	439GΩ	526GΩ	688GΩ		

82	Final Test Reports and Installation Forms
83	*Submit all required test reports and installation forms to commissioning@pacificorp.com*
84	Comments
85	*For items marked 'C' or 'U', list the associated line number, the defect, and what corrective actions were taken*
86	Line 38: This circuit breaker does not have a Trip 2 coil installed or wired. Lines 44-53: The manufacturer of this circuit breaker does not require any additional mechanism measurements or adjustments to be performed during initial acceptance testing.